UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/897,573	07/02/2001	Richard J. Markle	2000.089400	1243

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EXAMINER
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ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 06/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☐ Responsive to communication(s) filed on _____ .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-47_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) _1-47_ is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-
(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or
(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1-47 are rejected under 35 U.S.C. 102(e) as being anticipated by Singh et al('781).

Caims 1, 8 and 42,

Singh('781) discloses a method for determining grid dimensions, comprising a wafer having a

test structure comprising a plurality of intersecting lines that define a grid having openings(see

page 1, paragraph [0002]), illuminating a portion of the test feature(grid) to generate a reflection

profile and determining the dimension of the test feature(grid) on the reflection profile(see page

1, paragraph [0009]).

Claims 2 and 28,

Singh('781) discloses a method determining the dimension of the feature(grid) comprising:

comparing the generated reflection profile to a library of reference reflection profiles{each

reference reflection profile having as associated feature(grid) dimension metric}, selecting a

reference profile closest to the generated reflection profile and determining the dimension of the

feature(grid) based on the feature(grid) dimension metric associated with the selected reference

reflection profile(see page 1, paragraph [0009] and Figures 6a and 6b).

Claims 3,12,14, 20 and 22

Singh('781) discloses determining at least one parameter of an operating recipe of an etch(photolithography) tool adapted to etch a subsequent wafer based on the determined feature(grid) dimension(see Figure 6a).

Claims 4,6,13, 15, 21, 23, 37 and 38,

Singh('781) discloses determining at least one parameter of the operating recipe of the etch(photolithography) tool comprising determining at least one of an etch time parameter, a plasma chemical composition parameter, an RF power parameter, a gas flow parameter, a chamber parameter a chamber pressure parameter, an end-point signal parameter, an exposure time parameter, an exposure dose parameter, a depth of focus parameter, a resist spin speed parameter, a soft bake temperature parameter, a post exposure bake temperature parameter, a cool plate temperature parameter, a developer temperature parameter and a focus tilt parameter(see Figure 6a, page 5 paragraphs[0050, 0051, 0056 and 0057] and page 6 paragraph [0062]).

Claim 5,

Singh('781) discloses determining at least one parameter of an operating recipe of an etch(ptotolithography) tool adapted to process a wafer based on the determined feature(grid) dimension(see Figure 6b).

Claims 7, 16, 24, 29 and 34,

Singh('781) discloses generating the reflection profile based on at least one of intensity and phase of the reflected light(see 6a, page 2, paragraph [0012] and page 5, paragraphs [0050 and 0051]).

Claims 9, 10,17, 18,25, 26 and 39,

Singh('781) discloses that any disclosed feature could be combined with one or more other features of the other aspects as may be desired and advantageous for any given or particular application(see page 6, paragraph [0065] and page 1, paragraph [0002]). This includes identifying a fault condition, determining at least a width dimension, a depth dimension or a sidewall angle dimension.

Claims 11, 33 and 41

Singh('781) discloses a method for determining feature(grid) dimensions comprising; providing a wafer having a test structure comprising a plurality of intersecting lines that define a feature(grid) having openings(see page 1, paragraph[0002]), illuminating at least a portion of the grid with a light source(see Figure 6), measuring light reflected from the illuminated portion of the grid to generate a reflection profile(see Figure 6b), comparing the generated reflection profile to a library of reference reflection profiles, each reference reflection profile having an associated feature(grid) dimension metric, selecting a reference profile closest to the generated reflection profile and determining a dimension of the feature(grid) based on the feature(grid) dimension metric associated with the selected reference profile(see Figures 6a and 6b and page 1, paragraphs [0002] and [0009]).

Claims 19, 31 and 36,

Singh('781) discloses a method for determining grid dimensions, comprising: providing a wafer

having a test structure comprising a plurality if intersecting lines that define a grid having

openings(see page 1 , paragraph [0002]), illuminating a portion of the grid with a light

source(see page 1, paragraph [0009]), measuring light reflected from the illuminated portion of

the grid to generate a reflection profile(see page 1, paragraph [0009]), comparing a generated

profile to a target reflection profile(see Figures 6a and 6b) and determining a dimension of the

grid based on the comparison of the generated reflection profile and the target reflection

profile(see page 1, paragraph [0009] and Figures 6a and 6b).

Claim 27,

Singh('781) discloses a metrology tool adapted to receive a wafer having a test structure(see

Figure 6b) comprising a plurality of intersecting lines that define a grid having openings(see

page 1, paragraph [0002]), a light source(see Figure 6) adapted to illuminate a portion of the

grid(see page 1, paragraph [0009]), a detector(see Figure 6) to measure light reflected from the

illuminated portion of the grid to generate a reflection profile(see page 1, paragraph [0009]) and

a data processing unit(see Figure 6(to determine a dimension of the grid based on the reflection

profile(see Figures 6a and 6b).

Claims 30 and 35,

Singh('781) discloses a metrology tool comprising at least one of a scatterometer, an

ellipsometer and a reflectometer(see Tille and page 2, paragraph [0013}).

Claims 32 and 45,

Singh('781) discloses a metrology tool adapted to receive a wafer having a test structure(see figure 6b) comprising a plurality of intersecting lines that define a grid having openings(see page 1, paragraph [0002]), a light source(see Figure 6) to illuminate a portion of the grid(see page 1, paragraph [0009]), a detector(see page 1, paragraph [0009]) to measure light reflected from the illuminated portion of the grid to generate a reflection profile(see page 1, paragraph [0009]), a data processing unit(see Figure 6) to determine a dimension of the grid based on the reflection profile(see Figures 6a and 6b) and a controller(see Figure 6b) to determine at least one parameter of the operating recipe of the processing tool based on the determined grid dimension(see Figures 6a and 6b).

Claims 40, 46 and 47,

Singh('781) discloses a light source(see Figure 6) to illuminate a portion of the grid(see page 1, paragraph [0009]), a detector(see Figure 6) to measure light reflected from the illuminated portion of the grid to generate a reflection profile(see page 1, paragraph [0009]) and a data processing unit(see Figure 6) to compare the generated reflection profile to a library of reference profiles(see figure 6b), each reference reflection profile having an associated grid dimension metric, a select reference profile closest to the generated reflection profile(see Figure 6b) and determine a dimension of the geid based on the grid dimension metric associated with the selected reference reflection profile(see Figures 6a and 6b and page 1, paragraphs [0002] and [0009]).

Claims 43 and 44,

Singh('781) discloses a test structure having a grid in the process layer(see page 1, paragraph [0002]) and at least one photoresist layer(see page 1, paragraph [0003]).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Willie Davis whose telephone number is 703-305-5169. The examiner can normally be reached on 9:30am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 703-308-4881. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-0956 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7722.

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June 19, 2003

Michael P. Stafira
Primary Patent Examiner
Technology Center 2800